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Only to such subjects was special attention given as was demanded by specific gifts, mining, metallurgy and architecture being instances. The reason for this restraint was regard for the institute and the admirable work which it was doing and the belief that there should be but one technical school in Boston. President Eliot continually sought a merger with the institute and refrained from developing a competing school.

The McKay bequest to Harvard brought about a crisis and two years ago more active steps were taken to consolidate the institute with Harvard. It is related that once when the merger came up before the Harvard Faculty of Arts and Sciences a member of the faculty inquired what Harvard was to get out of it, to which President Eliot replied: "The merger is a subject under discussion by two groups of gentlemen, the Corporation of the Massachusetts Institute of Technology and the Corporation of Harvard University, and the sole consideration is the good of technical education in the community and in the country at large."

When the merger was abandoned Harvard still sought an organization which would compete in the least possible manner with the institute. The terms of the McKay bequest, however, made it necessary that Harvard give instruction in the same subjects as is given at the institute, and the university found its best solution of the situation in the organization of the Graduate School of Applied Science. Following its general motive of giving the best education to the exceptional student, Harvard has developed those subjects which are not touched upon by the institute, such as forestry and applied biology, the latter in the reorganized Bussey Institution, which has been made a part of the Graduate School of Applied Science. The McKay bequest now makes it necessary to develop the other branches, and in so doing to seek the best possible men. Two such men are considered Professor Swain and Professor Clifford.

The election of Professor A. Lawrence Lowell as president of Harvard, it is also thought, may have an influence in bringing Harvard and the institute into closer relation-

ship. President-elect Lowell is a member of the corporation of the institute and when the merger discussion was on he used his utmost efforts to bring about a union. As president of Harvard he will be in a better position to accomplish this object. Harvard will have ample funds for its School of Applied Science and can employ the best teachers there are. It also has sufficient land for the location of proper buildings. The institute, on the other hand, is handicapped by an improper location and insufficient funds to compete successfully against Harvard, fortified by the McKay bequest.—*Boston Transcript*.

#### SCIENTIFIC BOOKS

*Mechanics of Engineering, comprising Statics and Kinetics of Solids; the Mechanics of the Materials of Construction, or Strength and Elasticity of Beams, Columns, Shafts, Arches, etc., and the Principles of Hydraulics and Pneumatics, with Applications. For use in Technical Schools.* By IRVING P. CHURCH, Professor of Applied Mechanics and Hydraulics, College of Engineering, Cornell University. Revised edition. Pp. 854. New York, John Wiley & Sons. 1908.

Since the publication of Rankine and Weisbach, perhaps no single treatise which has attempted to cover the wide field of applied mechanics as taught in our American colleges of engineering, has been more useful than this one.

It has appeared in edition after edition until it would seem as if practically all the younger generation of engineers in this country must be familiar with it either as a text-book or as a work of reference. The book originally appeared in parts during the years 1886-7-8, so that it has now quite attained its majority. Its wide use by the profession has been due to its merits, which are many.

I may here mention some of them: 1. The subject matter of this book, which is central and essential to the training of every engineer, is presented as a series of semi-detached problems or developments which may be readily mastered separately, no one of which

requires ready familiarity with other parts of the book to make it available.

This kind of treatment may be likened to that used in the Euclidian geometry where a separate demonstration is invented for each proposition and few general methods are employed, a treatment in contrast with the developments of analytical geometry where general laws and methods are applied to successive cases or investigations. This kind of treatment has many advantages from the point of view of the practical man, while its disadvantages are perhaps principally encountered by those who must at some period of their career go somewhat more deeply into theoretical questions.

The contrast between the kinds of treatment I have in mind will be clear to any one who compares Grashof with Church.

2. The diagrams employed by Church were, I think, unique at the time his book was first published, in their combined simplicity and perspicacity. This arose, as I imagine, from the way in which the book came into existence as a transcript of the author's black-board lectures before his classes. Professor Church had the opportunity while yet a young man to devote himself to the single subject of applied mechanics exempt from the distractions which usually beset college teachers of that period of life who commonly have to teach first one and then another subject. He improved that opportunity to prepare this text-book. It was an excellent thing to do, and it was well done. It has stood the test of prolonged use. No important or extensive revision of the work has been undertaken by the author until now, and even now its general character and text has remained unchanged. To make a rough estimate, possibly 100 pages scattered throughout the book have been rewritten and replaced by a new or revised text, leaving the paging unchanged of so much of the original text as is retained. It is needless to say that the emendations and revisions have added greatly to the value of the book by the introduction of much new matter now necessary to the engineer, notably concrete beams, circular ribs and hoops, thick

hollow cylinders and spheres. The most important matters thus added are in the more abstruse parts of the subject, so that for the ordinary student the most important addition consists in the introduction of many valuable illustrative examples, a change which will meet general commendation. Indeed, the book would be improved by the introduction of still further examples. Another change, apparently small, but of real importance, is the adoption of 1.41 for the ratio of the two specific heats of gases instead of  $4/3$  used in previous editions, following the example of Weisbach. While  $4/3$  may be admissible as a rough average for gases whose molecules consist of three or more atoms, the gases the engineer ordinarily deals with consist so largely of diatomic molecules, especially air, that there is no excuse for using a value differing from the experimental value for air, unless the gas to be treated be known to be some polyatomic fluid, such as superheated steam, carbonic acid, ammonia or the like.

As a whole the book is singular for its clear, lucid treatment, wise selection of subjects and subordination of mathematical to mechanical considerations. It has more definitely in view the needs of the civil engineer than the mechanical or the electrical engineer. Indeed, the devotee of any of these branches of engineering must expect ultimately to specialize to a far greater extent than is possible in a general treatise like this.

HENRY T. EDDY

*Allen's Commercial Organic Analysis.* Third edition. Vol. II., Part III.

The volume in hand, which completes the treatise, is chiefly devoted to the aromatic substances and to the essential oils, resins, etc. The first part treats of the benzol derivatives included under the following heads: Characters and Classification of Aromatic Acids, Benzoic Acid and Its Derivatives, Cinnamic Acid and Its Derivatives, Salicylic Acid and Its Allies, Dihydroxybenzoic Acids and Their Allies, Gallic Acid and Its Allies, Phthalic Acids. Special attention is paid to salicylic acid, the detection and determination of which